CLAIMS

1. Hydrogen-trapping compound, characterized in that it comprises at least one mineral compound of general formula:

$$MX(OH)$$

in which:

- M represents a divalent transition element;
- O represents an oxygen atom;
- X represents an atom of group 16 of the Periodic Table of the Elements, excluding O; and
- H represents a hydrogen atom.

2. Compound according to Claim 1, in which M is chosen from the group consisting of Cr, Mn, Fe, Co, Ni, Cu and Zn.

3. Compound according to Claim 1, in which X is chosen from the group consisting of S, Se, Te and Po.

4. Compound according to Claim 1, in which M is Co or Ni.

5. Compound according to Claim 1 or 4, in which X is S.

6. Process for manufacturing a hydrogen-trapping compound according to Claim 1, the said process comprising the mixing, in aqueous solution, of at least one dissolved salt of dissolved X^{2-} and of at least one dissolved metal salt of M, so as to form a precipitate of the at least one metal sulphide of formula MX(OH).

7. Process according to Claim 6, in which the X^{2-} salt is chosen from Na_2, $(NH_4)_2$, Li_2, K_2 or a mixture thereof.

8. Process according to Claim 6, in which the metal salt of M is chosen from the group consisting of: $MSO_4 \cdot xH_2O$; $M(NO_3)_2$; $M(ClO_4)_2 \cdot xH_2O$; and MCl_2, in which M is as defined in Claim 1.

9. Process according to Claim 8, in which M is Co or Ni.

10. Process according to Claim 8 or 9, in which X is S.

11. Process according to Claim 6, in which the mixing in aqueous solution is carried out a pH of 4 to 12.

12. Process according to Claim 6, in which the molar ratio of the concentrations $[X^{2-}]/[M^{2+}]$ is from 7/8 to 1.5.

13. Process according to Claim 6, in which the at least one precipitated metal salt is extracted from the preparation solution by filtration, washing with water and then drying.

14. Method of encapsulating a solid waste, the said method comprising the following steps:

a) encapsulation using an organic encapsulation material, liquefied beforehand by heating the solid waste to be encapsulated, and of a hydrogen-trapping compound according to Claim 1;

b) cooling and solidification of the encapsulant obtained in step a).

15. Method according to Claim 14, in which the organic material is a bitumen.

16. Method according to Claim 14, in which the waste is radioactive or non-radioactive.

17. Method according to Claim 14, in which the waste is radioactive.

18. Method according to Claim 14 or 15, in which the hydrogen-trapping compound is mixed with the bitumen in an amount of 1.5 to 82% in total, expressed as mass of trapping compound with respect to the mass of bitumen.

19. Method according to Claim 14, in which the radioactive waste represents at least 45 wt% of the total mass of the waste encapsulated with the composite organic material after curing.

20. Method according to Claim 17, which furthermore includes a preliminary step of chemically coprecipitating the radioactive waste in solid form and of synthesizing the hydrogen-trapping compound in order to obtain a solid phase consisting of a mixture of the radioactive solid waste and of the H_2-trapping compound, the said solid phase then being incorporated into the organic encapsulation material, which is preliquefied by heating during step a) of the process.

21. Organic material for encapsulating radioactive waste, comprising an organic encapsulation material and at least one hydrogen-trapping compound according to any one of Claims 1 to 5.

22. Organic material for encapsulating radioactive waste according to Claim 21, in which the organic encapsulation material is a bitumen.

23. Organic material for encapsulating radioactive waste according to Claim 21 or 22, in which the hydrogen-trapping compound(s) represents (represent) in

total an amount of 1.5 to 82% expressed as mass of trapping compound with respect to the mass of bitumen.

24. Use of a compound according to Claim 1 for trapping hydrogen.

25. Use of a compound according to Claim 1 for trapping hydrogen produced by radiolysis within an organic material for encapsulating radioactive waste.

26. Use according to Claim 25, in which the organic matrix is a bitumen.